

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
WASHINGTON, D.C.

and

BEET SUGAR DEVELOPMENT FOUNDATION  
DENVER, COLORADO

and

MICHIGAN AGRICULTURAL EXPERIMENT STATION  
MICHIGAN STATE UNIVERSITY  
EAST LANSING, MICHIGAN

NOTICE OF RELEASE OF EXPERIMENTAL SUGARBEET GERMPLASM EL-X4 WITH WILD  
ANCESTRY AND SELECTION FOR APHANOMYCES RESISTANCE

The Agricultural Research Service of the U. S. Department of Agriculture, the Beet Sugar Development Foundation, and Michigan State University announce the joint release of experimental sugarbeet germplasm EL-X4. This experimental germplasm was last selected at the Betaseed, Inc. Aphanomyces nursery in Shakopee, MN in 2003 by Margaret Rekoske and Jay Miller, followed by seed production at Shakopee, MN in 2004. The derivation of this material stems from understanding and broadening the genetic base for Aphanomyces resistance in sugar beet. This line may be useful for a number of basic and applied investigations, and limited quantities of seed are being made available to facilitate further testing and development of these and additional goals, since wild beet germplasm has been used in their development.

Construction and evaluation of original and derived materials was done in the program of J. Mitchell McGrath, USDA-ARS East Lansing, MI beginning in 1997. This line is not currently suitable for variety development since it still has many characteristics of wild materials; however, it has some improvement in taproot characteristics relative to the wild accessions. In 2003, 64 genetically similar entries, standards and the sugarbeet parents were tested in the Shakopee Aphanomyces nursery and rated on a 1 (resistant) to 9 (susceptible) scale. The average of two Aphanomyces tolerant and two susceptible standards was 2.0 and 7.0, respectively (LSD<sub>0.05</sub>=1.83, average of two late readings), the sugar beet parents SP6822 and 6869 had scores of 1.0 and 5.5, respectively, and release EL-X4 scored 3.8. From this nursery in 2003, approximately 20 roots were selected for improved root conformation and relative freedom from disease from within each release. Subsequently seed of each release was produced by inter-pollination of the selected plants the following year.

WB879, a wild *Beta vulgaris* spp. *maritima* accession (PI 540625) collected in 1989 on the coast of Brittany, France, was used as the wild beet donor germplasm in EL-X4. WB879 was used because its potential resistance to Aphanomyces diseases caused by *Aphanomyces cochlioides* by having a disease score of 1 (resistant) (rating system of 0-9 scale with 0 showing no symptoms and 9 being dead) in the 1994 Beta germplasm evaluation nursery conducted by C.M. Rush in Amarillo, Texas (Sugarbeet.Aphan.94.Rush; <http://www.ars-grin.gov/cgi-bin/npgs/html/eval.pl?269>). WB879 is diploid, biennial, and has resistance reported for beet western yellows virus and *Polymyxa betae*. Susceptible sugar beet 6869 (a progenitor of C869, PI 628754) was used as the sugar beet parent, and as a donor of

the self-fertility (Sf) and nuclear male sterility characters. This release is expected to be self-fertile and segregating for nuclear male sterility. Tested seed was harvested from the sugar beet parent.

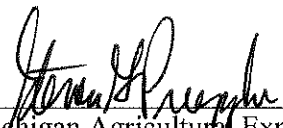
EL-X4 (4PS1929) is from the cross between a single WB879 plant and the same 6869 plant used for EL-X3. F1 seed from this cross was planted in the 1998 observation nursery in Saginaw, MI, and seven roots were selected on plant vigor, and selfed S2 seed was produced in the 1999 greenhouse. S2 seed was provided for the Shakopee Aphanomyces nursery, and seed was produced from selections within the nursery that had low disease incidence and improved root shape (e.g. lack of sprangled roots).

These EL-X (for experimental) lines are being released as germplasm resources for breeders to use in developing parental lines with potentially new sources of resistance to diseases caused by Aphanomyces. These lines also contain a series of useful characters at low allele frequencies derived from the parent's components, such as those necessary to breed for seed parents used to create cytoplasmic male sterility-mediated hybrids. Seed will be available for use by writing to Dr. J. Mitchell McGrath, USDA-ARS, 494 PSSB, Michigan State University, East Lansing, MI 48824-1325 (mitch.mcgrath@ars.usda.gov), pending seed increase. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. Efforts of Yi Yu, Tim Duckert, and Teresa Koppin as well as Betaseed, Inc. in generating these materials are gratefully acknowledged. It is requested that the author be notified if this germplasm contributes to the development of a new breeding line or cultivar. U.S. Plant Variety Protection will not be requested.

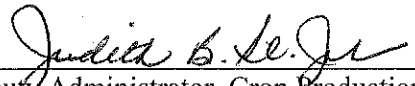
Signatures:

  
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4/14/09  
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5/19/09  
Date